

CURRICULUM VITAE DENNIS BODEWITS

PERSONAL DETAILS

Full name Dennis Bodewits
Email Dennis.Bodewits@nasa.gov

SCIENTIFIC INTERESTS

The formation and evolution of planetary systems; experimental, theoretical and observational studies of atomic and molecular physics in gaseous disks, planets, and comets. My experience includes experimental atomic physics, ion beam operations, optical, UV, EUV and X-ray spectroscopy. I have successfully executed observations and/or analyzed existing data from a wide variety of space-borne observatories, such as CHANDRA, XMM, EUVE, HST/STIS, Swift and various solar wind probes (ACE, SOHO, Ulysses).

RESEARCH EXPERIENCE

2007 – present **Postdoctoral Scientist,**
NASA Postdoctoral Program (NPP) Fellowship, NASA Goddard Space
Flight Center, Solar System Exploration Division, Greenbelt, MD
Observational and theoretical studies of comets, gaseous disks around
young stars, and exoplanets using various space telescopes (Swift,
Hubble Space Telescope, Chandra). Development of analytical methods
to apply grism spectroscopy (SWIFT-UVOT) on extended sources
(comets).

2007 **Postdoctoral Scientist**
Nuclear Accelerator Institute (KVI), Atomic Physics Dept., University of
Groningen, Groningen, The Netherlands
Experimental, theoretical, and observational studies of charge
exchange in the solar system using various high energy space
observatories (XMM, Chandra).

2003 – 2007 **Junior Scientist**
Nuclear Accelerator Institute (KVI), Atomic Physics Dept., University of
Groningen, Groningen, The Netherlands
Experimental, theoretical, and observational studies of charge
exchange in the solar system and their application in controlled fusion
environments.

AWARDS

2007 – present NASA Postdoctoral Program (NPP) Fellowship
2007 Van Swinderen Thesis Prize, Royal Physical Society
2006 Dutch Research Council, Extended International Travel Grant

EDUCATION AND ACADEMIC QUALIFICATION

- 2003 – 2007 **Ph.D. Natural Sciences & Mathematics**, Nuclear Accelerator Institute (KVI), Atomic Physics Dept., University of Groningen
 Thesis: ‘Cometary X-rays’
 Supervisors: Prof. dr. ir. R. Hoekstra (KVI Atomic Physics)
 Prof. dr. A. G. G. M. Tielens (NASA Ames Research Centre)
- 1997 – 2003 **M.Sc. Astrophysics**, University of Groningen
- 1997 – 2003 **M.Sc. Experimental Physics**, University of Groningen

ACCEPTED OBSERVING & RESEARCH PROPOSALS

- 2010 **Swift Target of Opportunity Observations:** “Heterogeneity of Stardust’s Comet 81P/Wild-2 (PI)
- 2010 **NOAO Kitt Peak:** “HD 185269: host of a short period eccentric planet” (Co-I; PI N. Iro; Pending)
- 2010 **ESO VLT:** “Planet-Star Interactions in Eccentric Systems” (Co-I; PI D. Christian; Pending)
- 2010 **Chandra Cycle 12:** “What Drives Planet Induced Stellar X-ray Variability?” (PI; Pending)
- 2010 **Chandra Cycle 12:** “Comet 103P/Hartley-2 During the EPOXI Spacecraft Encounter” (Co-I; PI C.M. Lisse; Pending)
- 2010 **Swift Target of Opportunity Observations:** “Swift/UVOT Spectroscopy of the Outburst of Comet 29P/SW-1 (PI)
- 2010 Asteroid
- 2010 **Swift Cycle 6:** “UVOT Spectroscopy of 9P/Tempel-1 and 103P/Hartley-2, Targets of the Stardust-NEXT and EPOXI missions” (PI)
- 2010 **XMM-Newton AO-9:** “Planet-Star Interactions in Eccentric Systems” (PI)
- 2010 **XMM-Newton AO-9:** “First X-ray Observations of a Main Belt Comet: Linking X-ray Astronomy to Astrobiology” (Co-I; PI K. Dennerl)
- 2009 **Swift Cycle 5:** “Swift UVOT Observations of a Target of Opportunity Comet” (PI)
- 2009 **Swift Cycle 5:** “Swift UVOT Observations of Stardust’s Comet 81P/Wild-2” (PI)
- 2009 **Swift Target of Opportunity Observations:** “TOO Observations of Comet Lulin (Co-I; PI J. Carter)
- 2009 **NASA Planetary Astronomy Program:** “An Infrared Study of Volatile Oxidized Carbon in Comets (Collaborator; PI M. DiSanti)
- 2008 **Swift Target of Opportunity Observations:** “UV and X-ray Observations of Comet 8P/Tuttle” (PI)
- 2007 **Chandra Director’s Discretionary Time:** “Utilizing the exceptional outburst of Comet 17P/Holmes for probing the solar wind at 2.5 AU” (Co-I; PI K. Dennerl)

- 2007 **Suzaku Cycle 2:** Sampling the Solar Wind with the XIS X-ray Spectrum of the Comet 8P/Tuttle" (Co-I; PI G.V. Brown)
- 2007 **Chandra Cycle 9:** "High Resolution Imaging and Spectroscopy of 8P/Tuttle" (Co-I; PI D.J. Christian)
- 2006 **Chandra Director's Discretionary Time:** X-ray observations of the fragmenting comet 73P/Schwassmann-Wachmann 3B (Co-I; PI S. Wolk)
- 2006 **Chandra Cycle 8:** "Solar wind charge exchange induced X-rays at Venus during the Messenger flyby" (Co-I; PI K. Dennerl)
- 2005 **XMM-Newton AO-5:** "Comet SW3 and XMM-Newton: an extremely close encounter with a flying laboratory" (Science PI; PI K. Dennerl)

REFERRAL ACTIVITY

Peer reviewer for Guest Investigator programs for various observatories (Swift, GALEX), Journals (Icarus, AJ), and various research programs (NASA Astrobiology Institute)

PROFESSIONAL MEMBERSHIPS

American Geophysical Union, American Astronomical Society (Division of Planetary Sciences and High Energy Astrophysics Division), EuroPlanet Network

MEDIA/SCIENCE COMMUNICATION AND OUTREACH

- 2010 Donald E. Bianchi Planetarium Lecture for general audience
- 2009 Numerous newspaper and radio interviews about the Swift observations of comet Lulin
- 2009 Astronomy Picture of the day, Feb 21 2009: 'The Swift View of Comet Lulin'
- 2008 Numerous newspaper interviews about the Swift video of break-up activity of 73P/Schwassmann-Wachmann C
- 2007 Popular seminar on Cometary X-rays for the Groningen Society for Meteorology and Astronomy, Groningen (Netherlands)
- 2007 Author of 4-page feature article on Cometary X-rays for the educational website Kennislink.nl (Maintained by the Dutch Dept. of Science and Education)
- 2004 – 2007 University of Groningen: Public talks and demonstrations on Comets and Solar System evolution

SCIENTIFIC PUBLICATIONS

1. D. Bodewits, G.L. Villanueva, M.J. Mumma, W.B. Landsman, J.A. Carter, and A.M. Read, 'Swift UVOT Grism Spectroscopy of Comets: a First application to C/2007 N3 (Lulin)', submitted
2. D. J. Christian, D. Bodewits, C.M. Lisse, K. Dennerl, S. J. Wolk, H. Hsieh, T.H. Zurbuchen, and L. Zhao, 'Chandra Observations of Comets 8P/Tuttle and 17P/Holmes during Solar Minimum', **ApJS**, 174, 447 (2010)
3. S.J. Wolk, C.M. Lisse, D. Bodewits, D. J. Christian, & K. Dennerl, 'Chandra's close encounter with the disintegrating comets 73P/Schwassmann-Wachmann-3 Fragment B and C/1999 S4 (LINEAR)', **ApJ**, 694, 1293 (2009)
4. M. Reyniers, P. Degroote, D. Bodewits, J. Cuypers, & C. Waelkens, 'The Rotation and coma profiles of comet C/2004 Q2 (Machholz)', **A&A**, 494, 379 (2009)
5. P. Degroote, D. Bodewits, & M. Reyniers, 'Folding ion rays in comet C/2004 Q2 (Machholz) and the connection with the solar wind' **A&A**, Volume 477, Issue 3, L41 (2008)
6. D. Bodewits & R. Hoekstra, 'Electron capture in collisions between O^{6+} ions and H_2O molecules', **Phys. Rev. A**, vol. 76, Issue 3, id. 032703 (2007)
7. D. Bodewits, D. J. Christian, M. Torney, M. Dryer, C. M. Lisse, K. Dennerl, T. H. Zurbuchen, S. J. Wolk, A. G. G. M. Tielens, R. Hoekstra, R., 'Spectral analysis of the Chandra comet survey', **A&A**, Volume 469, Issue 3, p. 1183 (2007)
8. C. M. Lisse, D. Bodewits, D. J. Christian, S. J. Wolk, K. Dennerl, T. H. Zurbuchen, K. C. Hansen, R. Hoekstra, M. Combi, C. D. Fry, M. Dryer, T. Makinen, W. Sun, 'Chandra observations of Comet 9P/Tempel 1 during the Deep Impact Campaign', **Icarus**, Volume 190, Issue 2, p. 391 (2007)
9. D. Bodewits, R. Hoekstra, B. Seredyuk, R. W. McCullough, G.H. Jones and A.G.G.M. Tielens, 'Charge exchange emission from solar wind helium ions', **ApJ**, 642, p. 593 (2006)
10. R. Hoekstra, D. Bodewits, S. Knoop, R. Morgenstern, L. Mendez, L.F. Errea, C. Illecas, A. Macias, B. Pons, A. Riera, F. Aumayr and HP. Winter, 'Charge exchange data for alpha particles interacting with atoms and molecules.' **Atomic and Plasma-Material Interaction Data for Fusion** (2006)
11. C.M. Lisse, D.J. Christian, K. Dennerl, S.J. Wolk, D. Bodewits, R. Hoekstra, M.R. Combi, T. Mäkinen, M. Dryer, C.D. Fry and H. Weaver, 'Chandra observations of Comet 2P/Encke 2003: First detection of a collisionally thin, fast solar wind charge exchange system.', **ApJ**, 635, 1329 (2005)
12. D. Bodewits, A.G.G.M. Tielens, R. Morgenstern and R. Hoekstra, 'Fingerprints of charge exchange between He^{2+} and water', **NIMPB**, v235, iss. 1-4, p358 (2005)
13. B. Seredyuk, R. W. McCullough, H. Tawara and H B Gilbody, D. Bodewits, R. Hoekstra and A.G.G.M. Tielens, P. Sobocinski, D. Pesic, R. Hellhammer, B. Sulik and N. Stolterfoht, O. Abu-Haija and E.Y. Kamber, 'Charge exchange and dissociative processes in collisions of slow He^{2+} ions with H_2O molecules', **Phys. Rev. A**, 71, p022705 (2005)

14. D. Bodewits, R. Hoekstra, and A.G.G.M. Tielens, 'Probing the interaction between comets and the solar wind', in ***X-ray diagnostics of astrophysical plasmas: Theory, Experiment, and Observation***, ed. R. Smith, AIP Conference Proceedings, Volume 774, p. 261 (2005)
15. D. Bodewits, R.W. McCullough, A.G.G.M. Tielens and R. Hoekstra, 'X-ray and far-ultraviolet emission from comets: Relevant charge exchange processes, **Phys. Scr.**, C70, 17 (2004)
16. D. Bodewits, Z. Juhasz, R. Hoekstra and A.G.G.M. Tielens, 'Catching Some Sun: probing the solar wind with cometary X-Ray and Far-ultraviolet emission', **ApJ**, 606, L81 (2004)

CONFERENCES AND SEMINARS

2010

Donald E. Bianchi Planetarium Lecture, California State University, Northridge (CA), May 2010

Invited Seminar: *'The Composition and Evolution of Comets'*

High Energy Astrophysics Division Meeting (HEAD), Waikoloa (HI), Mar 2010

Oral Presentation: *'Grism Spectroscopy of Comets'*

2009

5 Years of Swift, State College (PA), Nov. 2009

Invited Presentation: *'Cometary Science with Swift'*

Division of Planetary Sciences Meeting, Fajardo, Puerto Rico, Oct. 2009

Oral Contribution: *'Swift UVOT Grism Spectroscopy of Comet C/2007 N3 (Lulin)'*

European Planetary Sciences Conference, Potsdam (Germany), Sep. 2009

Oral Contribution: *'Swift UVOT Grism Spectroscopy of Comet C/2007 N3 (Lulin)'*

Exoplanet Seminar, Astrophysics Science Division, NASA GSFC, Greenbelt (MD), April 2009

Invited Seminar: *'Charge Exchange in Comets and Planetary Systems'*

Planetary Astronomy Lunch Series, University of Maryland, College Park (MD), Jan. 2009

Invited Seminar: *'Cometary X-ray and FUV emission'*

2008

Dept. of Terrestrial Magnetism, Carnegie Institution of Washington, Nov. 2009

Invited Seminar: *'Cometary X-rays'*

Division of Planetary Sciences Meeting (DPS), Ithaca (NY), Oct. 2008

Oral Contribution: *'Swift UV Observations of the Evolution of Comet 8p/Tuttle'*

Asteroids, Comets, Meteors 2008, Baltimore (MD), July 2008

Poster contribution: *'Swift Observations of Cometary X-Ray and UV Emission'*

The Local Bubble & Beyond II, Philadelphia (PA), April 2008

Oral presentation: *'Chandra Comet Observations in the Last Solar Cycle'*

Astrobiology Science Conference (AbSciCon), Santa Clara (CA), April 2008

Poster Contribution: *'Swift Observations of Cometary UV and X-ray Emission'*

High Energy Astrophysics Division Meeting (HEAD), Los Angeles (CA), April 2008

Oral Presentation: *'Swift UV Observations of the Evolution of Comet 8p/Tuttle'*

Astrophysics Science Division, NASA GSFC, Greenbelt (MD), March 2008

Invited Seminar: '*Cometary X-rays*'

2007

Groningen Soc. for Meteorology and Astronomy, Groningen (Netherlands), Oct. 2007

Invited (popular) seminar

Columbia University Astronomy & Astrophysics, New York City (NY), July 2007

Invited Seminar

X-Ray Emission in the Solar System, Cambridge, MA, July 2007

Invited presentation: '*Cometary x-ray emission modelling*'

2006

Johns Hopkins University, Applied Physics Laboratory (APL), Oct 2006, Laurel (MD)

Invited Seminar: '*Cometary X-rays*'

Lawrence Livermore National Laboratory (LLNL), Livermore (CA), Sep. 2006

Invited Seminar: '*Charge Exchange in Cometary Atmospheres*'

NASA Ames Research Center, Moffett Field (CA), Sep. 2006

Invited Seminar: '*Charge Exchange in Cometary Atmospheres*'

Solar System Exploration Division, NASA GSFC, Greenbelt (MD)

Invited Seminar: '*Cometary X-rays*'

Division of Planetary Sciences Meeting (DPS), Pasadena (CA), Sep. 2006

Poster contribution: '*Chandra Observations During The Deep Impact Campaign*'

Marshall Space Flight Center, Huntsville (AL), Sep 2006

Invited Seminar: '*Charge Exchange in Cometary Atmospheres*'

Harvard-Smithsonian Center for Astrophysics, High Energy Astrophysics Division and

Institute for Atomic and Molecular Physics, Cambridge (MA), Aug 2006

Invited Seminar, Visiting Scientist: '*Charge Exchange in Cometary Atmospheres*'

Deep Impact as a World Observatory Event, Brussels (Belgium), August 2006

Oral presentation: '*Chandra observations of 9P/Tempel 1 during the Deep Impact Campaign*'

18th Rencontres de Blois: 'Planetary Science – Challenges and Discoveries', Blois (France),

June 2006

Oral presentations, '*Space weather at 9P/Tempel 1: Chandra observations during the Deep Impact campaign*', and '*Charge Exchange Emission from Solar Wind Ions*'

Dutch Astronomical Society Meeting (NAC), Ameland (Netherlands), May 2006

Oral presentation: '*Diagnostics of cometary X-ray and Far-UV aurorae*'

2005

Dutch Astronomical Society Meeting (NAC), Blankenberge (Belgium), May 2005

Poster contribution: '*Catching some sun – an X-ray view on comet-solar wind interactions*'

Joint Assembly of AGU, SEG, NABS and SPD/AAS, New Orleans (LA), May 2005

Invited presentation, '*Charge exchange of solar wind alpha particles in cometary atmospheres*', and poster: '*The spatial distribution of comet - solar wind X-ray spectra*'

Dutch Physical Society (NNV), Atomic, Molecules and Optical Physics Fall Meeting, Lunteren (Netherlands), Nov. 2005

Poster Contribution: '*Cometary X-rays and FUV aurorae*'

2004

X-ray Diagnostics for Astrophysical Plasmas, Cambridge (MA), Nov. 2004

Oral presentation: *'Finding fingerprints: Probing the solar wind with comets'*

Dutch Physical Society (NNV), Atomic, Molecules and Optical Physics Fall Meeting, Lunteren (Netherlands), Nov. 2004.

Poster contribution: *'Finding fingerprints of solar wind electron capture in comets'*

8th European Physical Society Conference on Atomic and Molecular Physics, Rennes (France), July 2004

Oral presentation, *'Probing space weather via charge transfer in comets'*

Netherlands Institute for Space Research (SRON), Utrecht (Netherlands), June 2004

Invited seminar: *'Probing space weather with cometary X-ray and FUV emission'*

Dutch Astronomical Society Meeting (NAC), Vlieland (NL), May 2004

Oral presentation: *'Catching Some Sun: the interaction between comets and the solar wind'*

'Dutch activities in Laboratory Astrophysics', Forschungs Gemeinschaft Laboratory Astrophysics, Leiden (Netherlands), April 2004

Invited presentation: *'Catching Some Sun: the interaction between comets and the solar wind'*

2003

23th International Conference on Photonic, Electronic and Atomic Collisions (ICPEAC), Stockholm (Sweden), Jul. 2003

Poster contribution *'Ion interactions in cometary, planetary and fusion environments'*

Dutch Physical Society (NNV), Atomic, Molecules and Optical Physics Fall Meeting, Lunteren (Netherlands), Nov. 2003

Poster contribution (awarded with poster prize), *'Catching some sun'*

LEIF meeting, Belfast (UK), Jul. 2003

Oral presentation: *'Catching some sun'*